

REMARKS

Claims 1-10, 13-32 and 34-48 are pending in the present application. In the Office Action dated May 2, 2003, the Examiner rejected claims 1-10, 13-32 and 34-48 as unpatentable over claims 1-54 of U.S. Patent No. 6,322,626 B1 based upon the judicially created doctrine of obviousness-type double patenting. Claim 15 is rejected under 35 U.S.C. § 112, first paragraph. Claims 5, 26-32 and 34-36 are rejected under 35 U.S.C. § 112, second paragraph.

Claims 1, 2, 6-10, 13, 14, 19-22, 26, 29-31 and 37-44 are rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 3,710,251 to Hagge, *et al.* ("Hagge"). Claim 15 is rejected under 35 U.S.C. § 103(a) as unpatentable over the Hagge reference in view of U.S. Patent No. 6,073,681 to Getchel, *et al.* ("Getchel"). Claim 16 is rejected under 35 U.S.C. § 103(a) as unpatentable over the Hagge reference in view of U.S. Patent No. 4,432,635 to Mayer ("Mayer"). Claims 3-5, 17, 18, 23, 27, 32, 34, 35, 45-48 are further rejected under 35 U.S.C. § 103(a) as unpatentable over the Hagge reference in view of U.S. Patent No. 5,474,877 to Suzuki, *et al.* ("Suzuki"). Claims 24 and 36 are rejected under 35 U.S.C. § 103(a) as unpatentable over the Hagge reference in view of U.S. Patent No. 5,578,127 to Kimura ("Kimura"). Claims 25 and 28 are rejected under 35 U.S.C. § 103(a) as unpatentable over the Hagge reference alone. Applicants disagree with these grounds of rejection and wish to clarify various distinctions of the embodiments of the applicants' disclosed invention over the cited art. Reconsideration is therefore requested in light of the present amendment and following remarks.

The disclosed embodiments will now be discussed in comparison to the prior art. It is understood, however, that the following discussion of the disclosed embodiments, as well as the discussion of the differences between the disclosed embodiments and the prior art subject matter do not define the scope or interpretation of any of the claims. Instead, such discussed differences are offered merely to help the Examiner appreciate important claim distinctions as they are discussed.

Applicant teaches methods for controlling a temperature of a microelectronic substrate during application of a liquid to the substrate. In one embodiment, a method includes disposing the liquid on a first surface of the substrate, rotating the substrate to distribute the liquid over the first surface of the substrate, and directing a gas flow directly against the second surface of the substrate to control a temperature of the first surface of the substrate. Alternately, the gas flow may include first and second gas flows may be directed to first and second portions

of the substrate, respectively, to provide first and second heat transfer rates to the first and second portions. In further embodiments, the gas flow may comprise compressed air, and the liquid may comprise a liquid resist material. The methods taught by Applicant advantageously allow the temperature of the substrate to be controlled during the application of the liquid, thereby improving the manufacturing process and the quality of the resulting product.

The Examiner cites the Hagge reference. Hagge discloses a microelectronic heat exchanger pedestal for supporting a microelectronic chip during testing. Referring to Figure 1, the pedestal 10 includes a top surface 14 and a plurality of tube pins 16 that extend through the top surface 14 and are coupled to a vacuum source that is connected to the tubular line 13. A wafer 11 is retained on the top surface 14 by means of the vacuum. In order to test the wafer 11 under different temperature conditions, a gas may be delivered to the underside of the top surface 14 under prescribed flowrate and temperature conditions in order to provide the desired temperature at the wafer 11, as required by the test.

Hagge does not disclose, or fairly suggest that the top surface 14 may be rotated while the wafer is undergoing a test procedure. In fact, as further shown in Figure 1, test pins 19 extend from the support 35 to the wafer 11. Therefore, if the top surface 14 is rotated, the pins 19 will fail to maintain their desired positions on the wafer 11. Hagge, therefore, *teaches away* from a rotating wafer or semiconductor substrate support.

The Examiner further cites the Getchel reference. Getchel discloses a workpiece chuck that may be used to retain a semiconductor wafer. Specifically, Getchel discloses a workpiece chuck having at least one offset having an engagement surface.

The Examiner also cites the Mayer reference. Mayer discloses a support for a semiconductor wafer that retains a wafer by means of vacuum. Specifically, the Examiner cites Mayer for disclosing a support having electrical devices, including Peltier devices.

The Suzuki reference is also cited. Suzuki discloses a method for developing a resist pattern on a semiconductor substrate. In particular, the Examiner cites the Suzuki reference for disclosing a substrate support that is rotatable about a rotation axis.

In applying the Suzuki in combination with the Hagge reference, the Examiner fails to acknowledge that the Hagge apparatus and the Suzuki disclosure cannot produce the claimed apparatus without other important modifications that are not taught by the references. Specifically, the Hagge apparatus is configured to hold a wafer in a fixed position in order to maintain electrical contact between test points on the wafer and test probes. Rotating the support

surface of the Hagge device clearly would render it unsuited for its intended purpose, since the probes would fail to contact the wafer if the wafer was moved.

The Examiner further cites the Kimura reference. Kimura discloses a system for applying a process liquid; specifically, Kimura is cited for disclosing an upwardly facing basin positioned below the substrate.

Turning now to the claims, specific differences between the claim language and the applied art will be pointed out. Claim 1, as amended recites in pertinent part, “An apparatus for controlling a temperature of a microelectronic substrate, the substrate having a first surface and a second surface opposite the first surface, the apparatus comprising...*a substrate support having at least one support surface for engaging and supporting the substrate, the support surface being rotatable about an axis extending through the substrate and perpendicular to the first surface and the second surface...*” (Emphasis added). Hagge does not disclose this. Instead, Hagge discloses an apparatus that must hold a wafer stationary. Claim 1 is therefore now allowable over the cited art. Claims depending from claim 1 are similarly allowable based upon the allowable form of the base claim and further in view of the additional limitations in the dependent claims.

Claim 26, as amended, recites in pertinent part, “An apparatus for controlling a temperature of a microelectronic substrate, the substrate having a first surface and a second surface opposite the first surface, the apparatus comprising...*a substrate support having an engaging surface positioned to support a peripheral portion of the second surface of the substrate, the substrate support having an open portion projecting through the substrate support and adjacent the second surface of the substrate to allow direct thermal contact with the second surface, the support being rotatable about an axis extending through the substrate and perpendicular to the first surface and the second surface...*” (Emphasis added). Again, Hagge does not disclose this. Claim 26 is therefore now allowable over the cited art. Claims depending from claim 26 are similarly allowable based upon the allowable form of the base claim and further in view of the additional limitations in the dependent claims.

Claim 37, as amended, recites in pertinent part, “An apparatus for controlling a temperature of a microelectronic substrate, the substrate having a first surface and a second surface opposite the first surface, the apparatus comprising...*a substrate support having at least one support surface for engaging and supporting the substrate, the at least one support surface being rotatable about an axis extending through the substrate and perpendicular to the first surface and the second surface...*” (Emphasis added). Hagge does not disclose or suggest this.

Claim 37 is therefore now allowable over the cited art. Claims depending from claim 37 are similarly allowable based upon the allowable form of the base claim and further in view of the additional limitations in the dependent claims.

Claim 45, as amended, recites in pertinent part, "An apparatus for controlling a temperature of a microelectronic substrate having a first surface and a second surface opposite the first surface, the apparatus comprising...a first substrate support configured to engage the substrate, *the substrate support being rotatable about an axis extending through the substrate and perpendicular to the first surface and the second surface...*" (Emphasis added). Hagge does not disclose or suggest this. Claim 45 is therefore now allowable over the cited art. Claims depending from claim 45 are similarly allowable based upon the allowable form of the base claim and further in view of the additional limitations in the dependent claims.

With regard to Examiner's numerous rejections based upon 35 U.S.C. § 112, applicant respectfully submits that the foregoing amendments fully address these concerns.

With regard to Examiner's double patenting rejection, applicant herewith submits a terminal disclaimer.

Applicant notes that, to date, the 1449 from the Information Disclosure Statement filed August 7, 2001, has not been returned.

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,  
DORSEY & WHITNEY LLP



Steven H. Arterberry  
Registration No. 46,314  
Telephone No. (206) 903-8787

SHA:tlm

Enclosures:

Postcard

Terminal Disclaimer

Fee Transmittal Sheet (+ Copy)

DORSEY & WHITNEY LLP

1420 Fifth Avenue, Suite 3400

Seattle, WA 98101-4010

(206) 903-8800 (telephone)

(206) 903-8820 (fax)

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